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Two new species of the *Aradus transiens* group from China and Taiwan (Heteroptera, Aradidae)

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A b s t r a c t : Two new species of the flat bug genus *Aradus* FABRICIUS 1803 from China and Taiwan are described and figured. Both belong to the *Aradus transiens* group of species with long setigerous tubercles on antennal segments II + III, to which *A. transiens* KIRITSHENKO 1913, *A. malaisei* KORMILEV 1976, *A. omeiensis* HSIAO 1964 and *A. miyamotoi* HEISS & SHONO (in press) are assigned and are known to date from Far Eastern Palaearctics and Oriental Region. A key to species of the group is given.

K e y w o r d s : Heteroptera, Aradidae, *Aradus*, new species, China, Taiwan.

Introduction

The flat bug genus *Aradus* is represented in the P.R. of China so far by 14 species (LIU 1981, HEISS 2001a, 2001b), however two more are described (HEISS 2003 in press) but none has been reported yet from Taiwan (KORMILEV & FROESCHNER 1987, HEISS 2001a).

Examination of Oriental Aradidae in the collection of the author has proved, that there are a new species from China and Taiwan respectively, which are described below.

Surprisingly both species belong to the *Aradus transiens* group of Far-Eastern and Oriental species sharing the distinctive character of antennal segments II + III beset with long setigerous tubercles. All of them – except *A. miyamotoi* – were rarely collected and are distributed from Northern Myanmar (*A. malaisei* KORMILEV 1976) to Sichuan, China (*A. omeiensis* HSIAO 1964) and Russian Far East and Korea (*A. transiens* KIRITSHENKO 1913) but were also recently recorded from Japan (*A. miyamotoi* HEISS & SHONO, in press).

Measurements were taken with a micrometer eyepiece, 20 units equal 1 mm unless otherwise stated.

Taxonomy

Key to species of the *Aradus transiens* group

- 1 (4) Posterolateral angles of dorsal external laterotergites (deltg = connexiva) III-VI distinctly protruding..... 2

- 2 (3) Posterolateral angles of deltg III-V forming a blunt angle, those of deltg VI-VII of rectangular outline; lateral margins of pronotum not irregularly dentate; antennae shorter, ratio length of antennae / width of head 1.85; rostrum reaching $\frac{1}{2}$ of prosternum (♀, fig. 10); China, Sichuan..... *A. omeiensis* HSIAO 1964
- 3 (2) Posterolateral angles of deltg more acute, those of deltg VI-VII triangular; lateral margins of pronotum irregularly dentate; antennae longer, ratio length / width of head 2.39; rostrum reaching anterior border of mesosternum (♀, fig. 1); China, Shaanxi..... *A. quinlingshanensis* sp. nov.
- 4 (1) Posterolateral angles of deltg III-VI not or only slightly protruding..... 5
- 5 (6) Paranota whitish on anterior $\frac{1}{2}$, without a larger anterolateral tooth; lateral margins of pronotum evenly rounded; Russian Far East, Korea, Kuril Islands..... *A. transiens* KIRITSHENKO 1913
- 6 (5) Paranota unicolorous brown or with a whitish spot anterolaterally (*miyamotoi*), with a distinct larger anterolateral tooth..... 7
- 7 (8) Antennae shorter, ratio length of antennae / width of head about 1.86-2.00, anterolateral angles of paranota with a whitish spot; Japan..... *A. miyamotoi* HEISS & SHONO 2003 (in press)
- 8 (7) Antennae longer, ratio length of antennae / width of head about 2.27, anterolateral angles of paranota unicolorous..... 9
- 9(10) Anterolateral tooth situated at the edge of anterior margin; lateral margins evenly sinuate (♂, fig. 9); NE Myanmar..... *A. malaisei* KORMILEV 1976
- 10(9) Anterolateral tooth situated at $\frac{1}{3}$ of lateral margin, posteriorly to the tooth notched and subangularly expanded (♂, fig. 2); Taiwan..... *A. smetanai* sp. nov.

Description of news pecies

Aradus quinlingshanensis sp. nov. (Fig. 1, photo 1)

H o l o t y p e : Female, N-China, Shaanxi Prov., Quinling Shan 1300 m, E Xunyangba, 23 V – 13 VI 2000 C. Holzschuh.

D i a g n o s i s : Distinguished at once from all other species of the *transiens* group by the strongly posterolaterally projecting dorsal external laterotergites (deltg) and the dentate lateral margins of the pronotum.

D e s c r i p t i o n : Female, macropterous. Head, carinae of pronotum, lateral margins of scutellum and veins of corium partially beset with vertical cylindrical tubercles. Antennal segment I smooth, II + III with long setigerous tubercles, IV with smaller ones and longer setae on basal $\frac{2}{3}$, apex pilose.

General colouration of body and antennae ochraceous, dark brown to blackish are the smooth depressions of head, the smooth areas between the longitudinal carinae of pronotum, the apical half of scutellum and deltg VII + VIII, the latter yellowish along inner margin. Membrane brownish. Legs ochraceous, femora with a wider brownish ring at middle and a smaller one at apex, tibiae brownish at apex and base without a darker median ring, tarsal segment II apically brown.

H e a d : Shorter than width across eyes (25.5 / 28); lateral borders of clypeus subparallel, apex tuberculate. Antenniferous tubercles diverging anteriorly, nearly reaching apex of antennal segment I. Eyes globose, protruding laterally, preocular tubercle acute, postocular portion of head beset with a patch of longer tubercles. Vertex medially with elevated setigerous tubercles and 2 (1 + 1) smooth ovate depressions laterad. Antennae long,

2.39 × as long as width of head (61 / 25.5), segment I shortest, subcylindrical, II longest and cylindrical, III as II but shorter, IV fusiform. Relative length of antennal segments I / II / III / IV = 6 / 26 / 17 / 12. Rostrum arising from an open atrium, reaching anterior margin of mesosternum.

Pronotum: About 2.52 × as wide as long (58 / 23), paranota wide, expanded laterally, slightly reflexed, their margins irregularly dentate with a larger tooth anterolaterally. Posterior margin concave at middle. Disk with four longitudinal carinae, the inner ones reaching from anterior- to posterior margin, diverging posteriorly, the lateral ones are shorter.

Scutellum: Triangular, longer than wide (33 / 22) with strongly carinate lateral margins. Disk raised at basal 1/3 with 2 (1 + 1) smooth ovate spots between the scale-like granulation, posterior portion depressed and transversely rugose.

Abdomen: Posterolateral angles of deltg II-VII distinctly protruding, deltg VIII sinuate laterally. Corium expanded and reflexed anterolaterally, reaching ½ of deltg V. Veins of corium elevated, beset with long tubercles. Membrane fully developed with distinct veins, surface wrinkled. Spiracles II-VII ventral, remote from lateral margin, VIII lateral and visible from above.

Legs: Long and slender, trochanters of fore- and middle legs fused to cylindrical femora, trochanter of hind legs separated by a suture.

Measurements: Holotype: Length 7.6 mm; width of corium at base 2.7 mm; width of abdomen across tergite IV 3.6 mm; ratio length of antennae / width of head 2.39.

The male sex is unknown.

Ecology: The specimen was found under loose bark of a dead leaf tree.

Etymology: This interesting species is named after the type locality, Quinling Shan mountains in Shaanxi, China.

Discussion: Although only a single female specimen is at hand, *Aradus quinlingshanensis* sp. nov. is distinctive and easily recognized and distinguished from all related species by the dentate outline of the lateral border of abdomen and the differences mentioned in the key.

***Aradus smetanai* sp. n. (Fig. 2, 3-8, photo 2)**

Holotype: Male, Taiwan, Kaoshiung Hsien, Peimantashan trail 2020 m, 7.VII.1993 A. Smetana.

Diagnosis: This species is habitually very similar to *A. miyamotoi* from Japan and *A. malaisei* from Myanmar but shows different male genitalic structures and shape of pronotum. *A. omeiensis* from China, also only known from a single female specimen, has much shorter antennae (ratio length / width of head 1.85) and the position of the anterolateral tooth of the pronotum is different as well.

Description: Male, macropterous. Body covered with ochraceous scale-like flat granulation and erect tubercles. Antennal segment I smooth, II + III with long setigerous tubercles, IV with smaller ones and longer setae on basal 2/3, apex pilose.

General colouration of body and antennae brown, blackish are the smooth depressions of head, the smooth areas between the longitudinal carinae of pronotum and the apical half

of scutellum. Basal lateral expansion of corium and inner margin of paratergites VIII ochraceous, membrane brown. Legs ochraceous, femora and tibiae brownish at base and apex with a wide brownish ring at middle, tarsal segment II apically brown.

Head : Slightly wider than long (25.5 / 24); lateral margins of clypeus subparallel, apex granulate. Antenniferous tubercles reaching 2/3 of antennal segment I. Eyes globose, protruding laterally, preocular elevation blunt, postocular margin of head beset with longer tubercles. Vertex with elevated setigerous tubercles medially and 2 (1 + 1) smooth ovate depressions laterad. Antennae long and slender, $2.27 \times$ as long as width of head (54.5 / 24), segment I shortest, subcylindrical, II longest and cylindrical, III as II but shorter, IV fusiform. Relative length of antennal segments I / II / III / IV = 6.5 / 20 / 17 / 13. Rostrum arising from an open atrium, reaching to 1/4 of mesosternum.

Pronotum : About $2.27 \times$ as wide as long (47 / 19), paranota expanded laterally, slightly reflexed and angularly rounded, their margins irregularly dentate with a larger tooth anterolaterally. Posterior margin concave at middle. Disk with four longitudinal carinae, the inner ones reaching from anterior- to posterior margin, diverging posteriorly, the lateral ones are shorter.

Scutellum : Triangular, longer than wide (27 / 19) with strongly carinate lateral margins. Disk raised at basal 1/3 with 2 (1 + 1) smooth ovate spots between the scale-like granulation, posterior portion depressed and transversely rugose.

Abdomen : Lateral borders slightly rounded, posterolateral angles of deltg II – V not protruding, VI rounded and slightly protruding, VII sinuate and strongly protruding, VIII triangular. Corium expanded and reflexed anterolaterally, reaching posterior margin of deltg V. Veins of clavus finely granulate, those of corium beset with tubercles. Membrane fully developed with distinct veins, surface wrinkled. Spiracles II – VII ventral, remote from lateral margin, VIII lateral and visible from above.

Legs : Long and slender, trochanters of fore- and middle legs fused to cylindrical femora, trochanter of hind legs separated by a suture.

Genitalic structures : Genital segment VIII cup-like, paratergites triangularly projecting posteriorly. Pygophore subglobose, flattened dorsally (fig. 7); parandria triangular as fig. 8; parameres slender, falciform with some longer bristles at base of shaft (fig. 3 – 6); tergite IX consisting of 2 L-shaped slender sclerites as in fig. 7.

Measurements : Holotype : Length 6.4 mm; width of corium at base 2.4 mm; width of abdomen across tergite IV 2.9 mm; ratio length of antennae / width of head 2.27.

The female sex is unknown.

Etyymology : I dedicate this interesting species to Dr. Aleš Smetana (Ottawa), who collected this and many other Aradidae in the Oriental Region and generously donated them to my collection.

Discussion : *A. smetanai* sp. nov. seems closely related to *A. malaisei*, sharing a similar shape of tergite IX. However other male genitalic structures are different (cf. VASARHELYI 1980). The respective structures of *A. miyamotoi* are different as well, which further differs by shorter antennae (ratio length / width of head 1.86-2.07) and more rounded paranota.

Acknowledgments

I warmly thank my friends Carolus Holzschuh (Villach) and Dr. Aleš Smetana (Ottawa) for the valuable material and Andreas Usel (Innsbruck) for the photographs.

Zusammenfassung

Aus China und Taiwan werden nachstehend zwei neue Arten der Gattung *Aradus* FABRICIUS 1803 beschrieben und abgebildet. Beide gehören zur *Aradus transiens* Artengruppe, welche durch die langen, borstentragenden, stiftförmigen Tuberkeln auf den Fühlergliedern II + III gekennzeichnet ist und die Arten *A. transiens* KIR. 1913, *A. malaisei* KORM. 1976, *A. omeiensis* HSIAO 1964 und *A. miyamotoi* HEISS & SHONO (im Druck) umfaßt, die nur aus dem Fernen Osten und der Orientalischen Region bekanntgeworden sind. Ein Bestimmungsschlüssel für diese Artengruppe wird vorgelegt.

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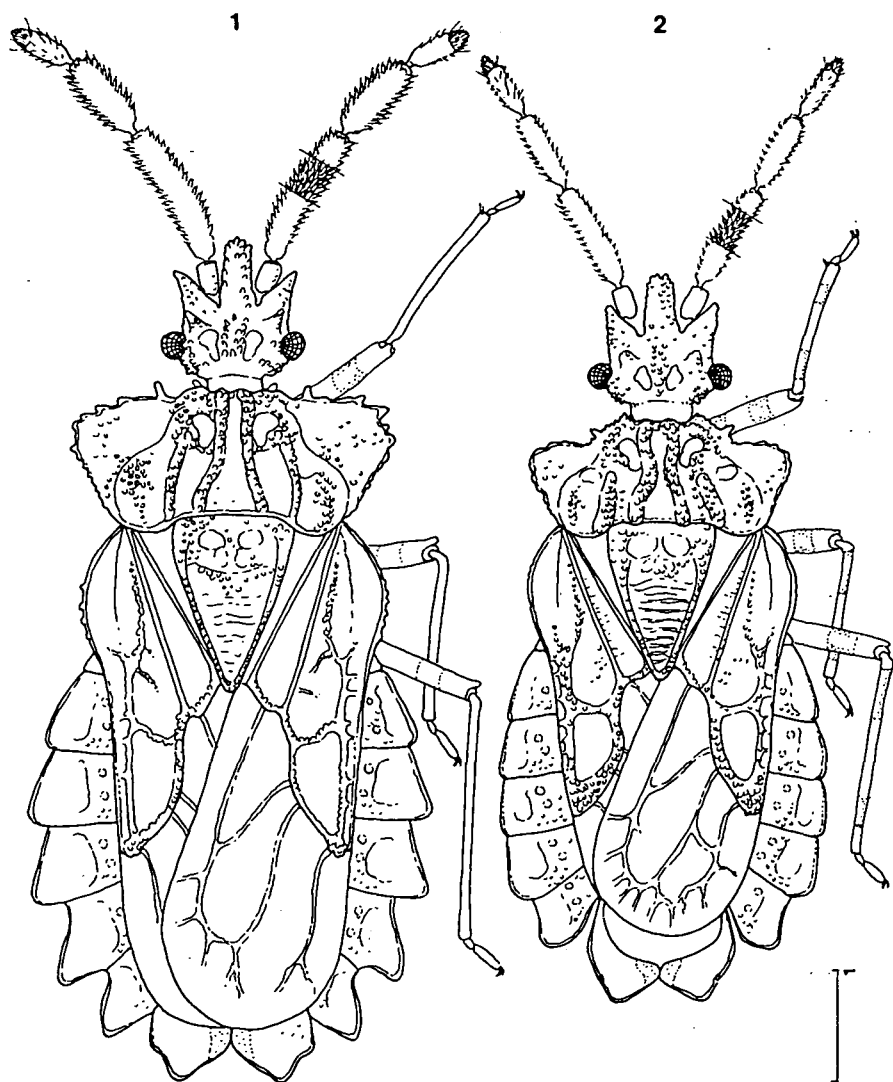


Fig. 1-2: 1 – *Aradus quinlingshanensis* sp. nov., holotype ♀ dorsal view, 2 – *Aradus smetanai* sp. nov., holotype ♂ dorsal view. Scale bar 1 mm.

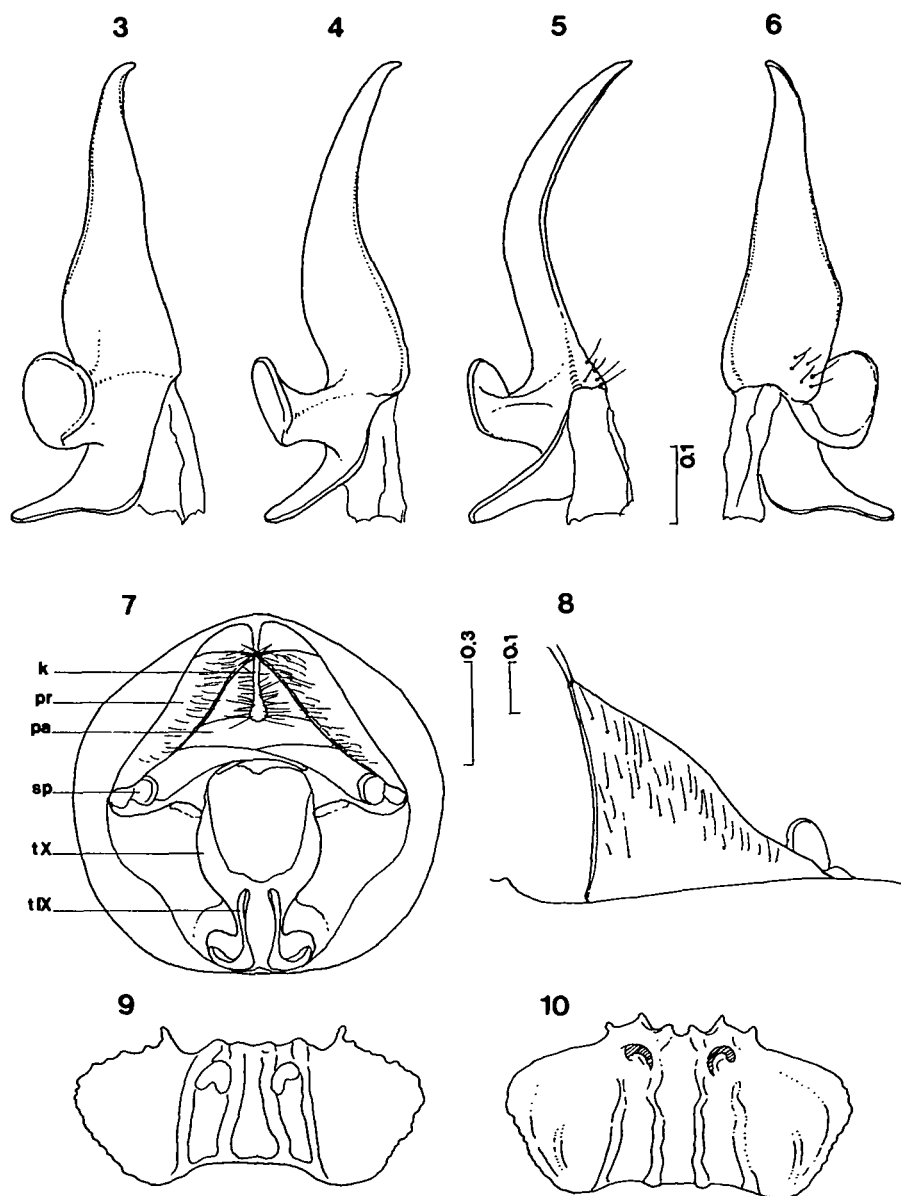


Fig. 3-10: 3-8 – *Aradus smetanai* sp. nov., genitalic structures. 3-6 – left paramere in different positions; 7 – pygophore dorsal view. Abbreviations : k – median keel; pa – paramere; pr – parandrium; sp – socket of paramere; t IX, t X – tergites IX, X. Scale bars 0.1 mm (fig. 3-6, 8); 0.3 mm (fig. 7). 9 – *Aradus malaisei*, pronotum (after VASARHELYI 1986); 10 – *Aradus omeiensis*, pronotum (after HSIAO 1964).

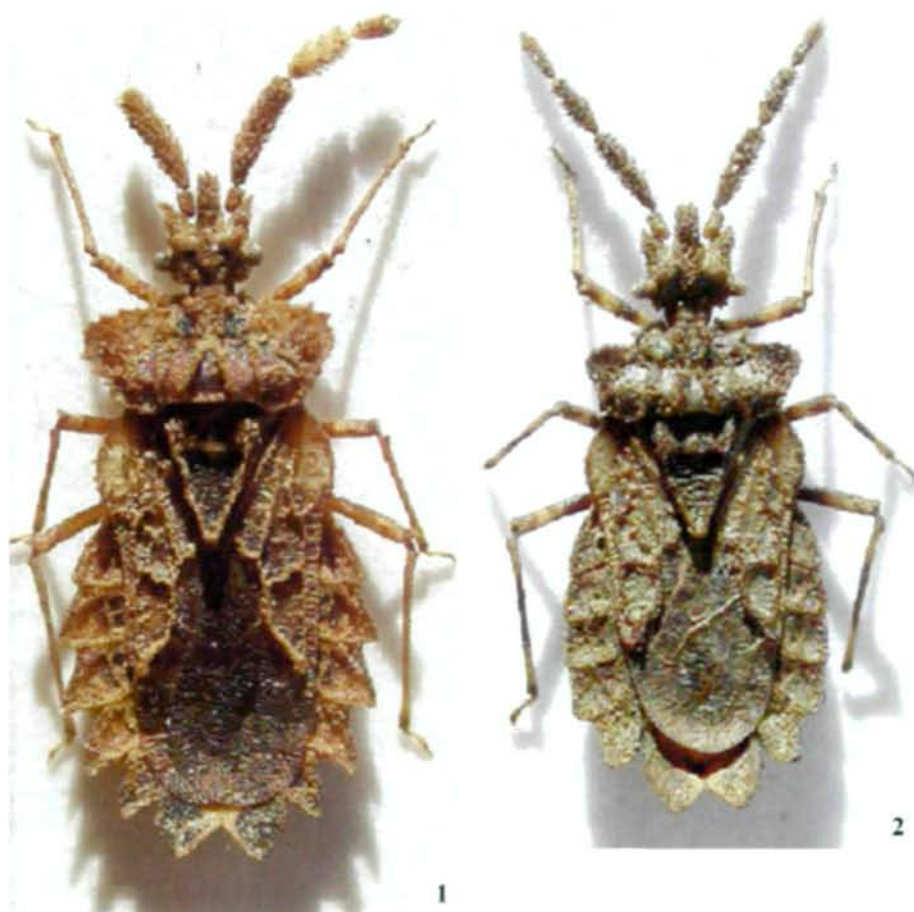


Photo 1-2: 1 – *Aradus quinlingshanensis* sp. nov., holotype female dorsal view, 2 – *Aradus smetanai* sp. nov., holotype male dorsal view.